

DEC 27, 2012

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
19 August 2004 (19.08.2004)

PCT

(10) International Publication Number
WO 2004/069505 A1

(51) International Patent Classification⁷: **B28B 7/36**

(21) International Application Number:
PCT/IT2004/000036

(22) International Filing Date: 2 February 2004 (02.02.2004)

(25) Filing Language: **Italian**

(26) Publication Language: **English**

(30) Priority Data:
VR2003A000012 5 February 2003 (05.02.2003) IT

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(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

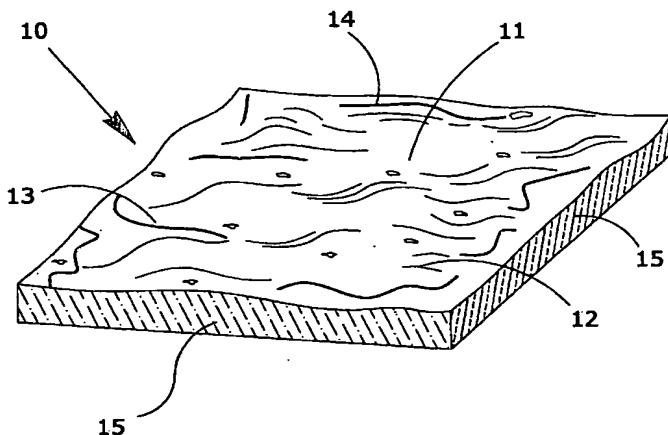
(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

[Continued on next page]

(54) Title: **METHOD FOR MANUFACTURING SLABS MADE OF STONE-LIKE AGGLOMERATED MATERIAL HAVING AN AGED UPPER SURFACE**



WO 2004/069505 A1

(57) Abstract: A method for obtaining antique-look slabs (10) made of stone agglomerate material has a first step of crushing the various materials of which the agglomerate consists, a second step of mixing the crushed materials, to obtain as homogeneous a product as possible, during which the binding resins are added, a third step of preparing a special die on the base of which there is a layer of special paper, advantageously polyethylene-coated paper, a fourth step of pouring the crushed materials into the die, a fifth step of covering the pressed agglomerate material with a second layer of special paper, advantageously polyethylene-coated paper, a sixth step of pressing and compacting the agglomerate, during which the desired shape is obtained, a seventh step of hardening the sheet or panel (10) at a predetermined temperature, an eighth step of separating the second layer of paper from the sheet (10), in which the second layer of special paper is separated from the sheet (10), by simply lifting and removing the paper substantially in a single piece, leaving the sheet (10) with an antique-look surface (11) in view.

WO 2004/069505 A1



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

"METHOD FOR MANUFACTURING SLABS MADE OF STONE-LIKE AGGLOMERATED MATERIAL HAVING AN AGED UPPER SURFACE"

5

TECHNICAL FIELD

The present invention relates to a method for obtaining antique-look slabs made of stone agglomerate material.

More specifically, the present invention relates to a method for obtaining slabs made of agglomerate material consisting of crushed pieces of stone compacted by means of binders, which can be used for the production of tiles, hobs and in general kitchen worktops, steps for staircases, etc., said sheets having an antique-look outer surface.

The invention applies mainly to the industrial processing sector for marble, stone, granite and the like.

BACKGROUND ART

It is known that in order to obtain sheets made of agglomerate material, the following procedure is normally used:

- a step of crushing the stone raw material;
- a step of mixing the crushed stone raw material and an inert filler with a binder,
- a step of pouring the mixture into a special die on the base of which there is a layer of special paper, normally polyethylene-coated;
- a step of covering the mixture with another layer of special paper, normally polyethylene-coated;
- a step of vibration and vacuum pressing of the mixture previously prepared;

- a step of heating in an oven at a predetermined temperature and for a predetermined time, in order to obtain a binder catalysis reaction;
- a step of removing, by grinding, the polyethylene-coated paper upper surface layer.

5 The sheets obtained from the firing step are then subjected to steps of polishing and/or cutting and/or chamfering and/or gauging and/or flaring.

Finally, as the last step the above-mentioned sheets
10 may be cut to obtain pieces of a predetermined shape.

A process like the one described above makes it possible to obtain panels or sheets made of agglomerate material with lengths, widths and thicknesses which are precisely predetermined, and may be implemented continuously
15 by a special plant.

The paper layer advantageously consists of polyethylene-coated paper comprising a layer of paper fixed to a polyethylene film by layers of adhesives. Improved results are achieved when using a paper support impregnated
20 with polyethylene deposited by spraying.

One disadvantage is the fact that the panels obtained by die forming always require processing on machine tools in order to produce the desired configuration on the finished product and removal of the polyethylene-coated paper affects
25 the cost of the finished product.

This final processing may also result in rejects which, considering that this is one of the final operations, have a considerable effect on the total production costs.

Moreover, such processing to remove shavings adds to
30 the overall production times and creates dust and residues which are sometimes difficult to dispose of.

If the polyethylene-coated paper is to be detached from the sheet without using machine tools to remove it, the surfaces obtained would be quite irregular, having an original antique look.

5 In such cases, one disadvantage is the fact that the surface of the sheet below the polyethylene-coated paper is extremely porous, tending to retain liquid and dust residues present in the environment, with inevitable periodic build-ups of dirt.

10 Another disadvantage is the fact that this porosity accelerates corrosive phenomena which, over time, cause the sheet made of agglomerate material to break.

DISCLOSURE OF THE INVENTION

15 The aim of the present invention is to provide a process for obtaining sheets made stone agglomerate material able to overcome or significantly reduce the above-mentioned disadvantages and having an antique look.

20 Another aim of the present invention is to provide an antique-look sheet made of stone agglomerate material which can be obtained with minimum cost and minimum waste and consumption of raw materials and processing tools.

This is achieved with a process for obtaining antique-look sheets having the features described in the main claim.

25 It is also achieved by means of an antique-look sheet made of stone agglomerate material having the features described in claims 6 to 8.

The dependent claims outline advantageous embodiments of the invention.

DESCRIPTION OF THE DRAWINGS

Other features and advantages of the invention are evident in the description which follows of an embodiment of the invention, by way of example and in no way limiting the 5 scope of application, with reference to the accompanying drawing, which illustrates a sheet made of antique-look agglomerate material obtained using a process disclosed.

DESCRIPTION OF A PROCESS ACCORDING TO THE INVENTION

10 The process disclosed consists of the following steps:

- a first step of crushing the various materials of which the agglomerate consists;
- a second step of mixing the crushed materials, to obtain as homogeneous a product as possible, during 15 which the binding resins are added;
- a third step of preparation of a special die on the base of which there is a layer of special paper, advantageously polyethylene-coated paper;
- a fourth step of pouring the crushed materials into the 20 die;
- a fifth step of covering the pressed agglomerate material with a second layer of special paper, advantageously polyethylene-coated paper;
- a sixth step of pressing and compacting the 25 agglomerate, during which the desired shape is obtained;
- a seventh step of hardening the sheet or panel at a predetermined temperature;
- an eighth step of separating the second layer of paper 30 from the sheet made of agglomerate material obtained;
- a ninth step of polishing the surfaces of the sheet;

in which the step of separating the second layer of polyethylene-coated paper from the sheet is performed by simply lifting the paper in a single piece, leaving the sheet with an antique-look surface in view.

5 A process like the one described above makes it possible to obtain antique-look sheets or panels made of agglomerate material with lengths, widths and thicknesses which are precisely predetermined, and is implemented continuously by a special automated plant.

10 The production of an antique-look sheet made of stone agglomerate material according to the invention requires minimum resources in terms of processing times and tool consumption.

15 The antique-look sheet exits the die forming unit as a product which is almost finished, since polishing makes it possible to obtain, on the sheet, an impermeable surface layer needed to prevent any corrosion and the penetration of dirt into the pores of the material.

20 Simply lifting the upper layer of polyethylene-coated paper guarantees an antique-look surface on the sheet, highlighting irregularities in its shape (ridges and depressions) as well as slight cracks.

DESCRIPTION OF THE DRAWINGS

25 Other features and advantages of the invention are evident in the description which follows of an embodiment of the invention, by way of example and in no way limiting the scope of application, with reference to the accompanying drawing, which illustrates a sheet made of antique-look
30 agglomerate material obtained using a process disclosed.

DESCRIPTION OF AN EMBODIMENT

In Figure 1, the reference number 10 generally indicates a sheet of stone agglomerate material, in the case 5 in question a sheet 10 with an antique-look surface 11 in view.

The surface 11 has ridges 12 and depressions 13 which are evenly distributed and micro-cracks 14.

The plan of the sheet 10 may have a quadrangular 10 configuration.

The edges 15 of the sheet 10 are smooth, regular and well squared so that the panel 10 can easily be used for immediate laying or for subsequent processing.

The invention is described above with reference to a 15 particular embodiment. It is nevertheless clear that the invention is not limited to this embodiment but is also susceptible to numerous variations, within the framework of technical equivalents.

CLAIMS

1. A method for obtaining antique-look slabs (10) made of stone agglomerate material which includes:
 - a first step of crushing the various materials of which the agglomerate consists;
 - a second step of mixing the crushed materials, to obtain as homogeneous a product as possible, during which the binding resins are added;
 - a third step of preparation of a special die on the base of which there is a layer of special paper, advantageously polyethylene-coated paper;
 - a fourth step of pouring the crushed materials into the die;
 - a fifth step of covering the pressed agglomerate material with a second layer of special paper, advantageously polyethylene-coated paper;
 - a sixth step of pressing and compacting the agglomerate, during which the desired shape is obtained;
 - a seventh step of hardening the sheet or panel (10) at a predetermined temperature;
 - an eighth step of separating the second layer of paper from the sheet (10);
in which the step of separating the second layer of special paper from the sheet (10) is performed by simply lifting and removing the paper substantially in a single piece, leaving the sheet (10) with an antique-look surface (11) in view.
2. The method according to claim 1, in which the step of polishing the sheet (10) is performed in order to obtain an impermeable surface layer on the surface of

the sheet in view.

3. The method according to claims 1 and 2, characterised in that the polishing step is performed using titanium grinding wheels designed not to alter the configuration of the surface (11) in view.

5 4. The method according to any of the foregoing claims, characterised in that it is implemented continuously by a special plant.

10 5. The method according to any of the foregoing claims, characterised in that the polyethylene-coated paper is impregnated with sprayed polyethylene.

15 6. A slab or panel (10) made of stone agglomerate material, characterised in that it has a surface (11) in view which has evenly distributed ridges (12) and depressions (13) designed to give it an antique look.

7. The slab (10) according to claim 6, characterised in that the surface (11) in view has a polished and impermeable surface layer.

20 8. The slab (10) according to claims 6 and 7, characterised in that the edges (15) are smooth, regular and squared.

25 9. The slab (10) according to any of the foregoing claims from 6 to 8, characterised in that it is made thanks to the use of a process according to one of the claims from 1 to 5.

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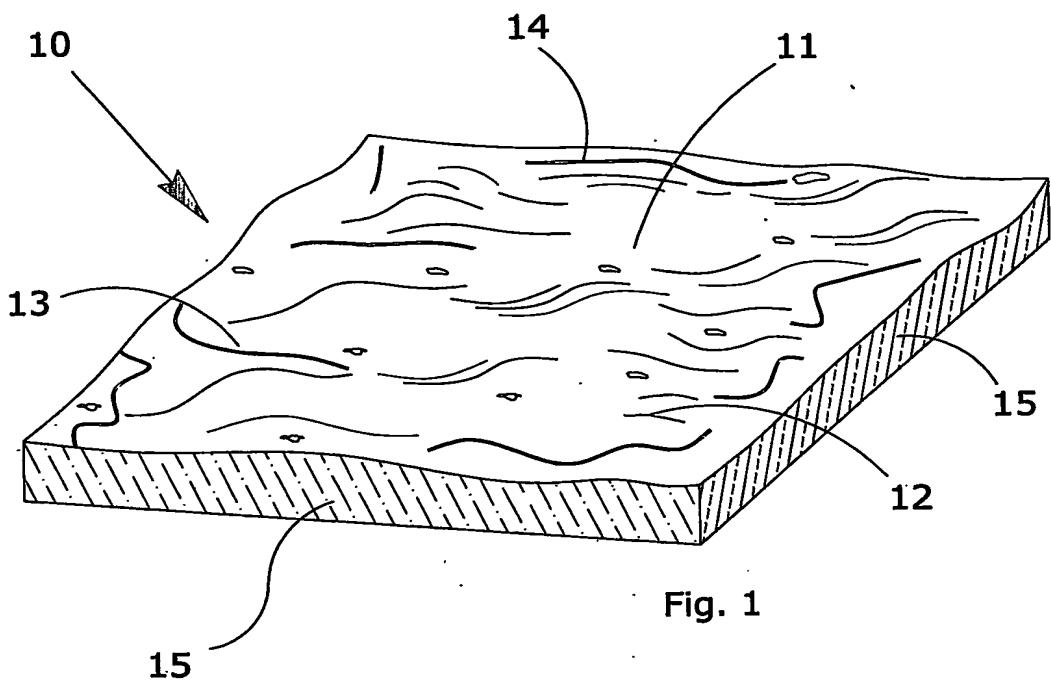


Fig. 1

INTERNATIONAL SEARCH REPORT

PCT/IT2004/000036

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B28B7/36

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B28B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 1 127 296 A (ICI LTD) 18 September 1968 (1968-09-18) page 1, line 61 - line 74 -----	1, 4, 6, 9
A	US 4 213 926 A (AOYAMA KENSUKE ET AL) 22 July 1980 (1980-07-22) column 4, line 4 - line 28; figure 4 -----	1-9
A	US 2 140 197 A (CLEMENTS BATCHELLER) 13 December 1938 (1938-12-13) page 3, left column, lines 3-13 -----	1-9

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

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- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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Date of the actual completion of the international search

Date of mailing of the international search report

14 July 2004

21/07/2004

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INTERNATIONAL SEARCH REPORT

PCT/IT2004/000036

Patent document cited in search report	Publication date		Patent family member(s)	Publication date
GB 1127296	A	18-09-1968	DE 1646617 A1 DE 1571575 A1 FR 1483464 A FR 93129 E US 3454688 A US 3526685 A	26-08-1971 28-08-1975 02-06-1967 14-02-1969 08-07-1969 01-09-1970
US 4213926	A	22-07-1980	NONE	
US 2140197	A	13-12-1938	NONE	